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IS 10695 (1983): Pocket Stereoscope [PGD 22: Educational Instruments and Equipment]



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Indian Standard

SPECIFICATION FOR
POCKET STEREOSCOPE

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MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
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Indian Standard

SPECIFICATION FOR POCKET STEREOSCOPE

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Indian Standard

SPECIFICATION FOR POCKET STEREOSCOPE

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 21 October 1983, after the draft finalized by the Optical and Mathematical Instruments Sectional Committee had been approved by the Mechanical Engineering Division Council.

0.2 The pocket stereoscope is a handy folding instrument for viewing pair of stereo-photos over a maximum area of 60 mm × 150 mm. It is suitable for interpretation of picture-details, in parts, of large format stereo pairs or landscapes, architectures, etc. The effect leads to three dimensional natural view.

0.3 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This specification covers the general and functional requirements and tests for pocket stereoscope.

2. TERMINOLOGY

2.0 For the purpose of this standard, the definitions given in IS : 1399-1959†, and the following definitions shall apply.

2.1 Stereoscopic Vision — The observation of an object or objects under conditions which present a different image to each eye to produce a solid or three dimensional effect.

*Rules for rounding off numerical values (revised).

†Glossary of terms used in optical technology.

2.2 Stereogram/Stereograph — A pair of photographs or transparencies with record of images of an object from two different positions, which may be fused stereoscopically to present the object in relief or in three dimensions.

2.3 Stereoscope — An instrument that reveals the contours in relief and presents a solid or three dimensional view of the object.

2.4 Stereoscopic Acuity — The ability of eyes to resolve and see as such the objects which are at varying distances from the observer.

2.5 Fusion of Images — Merging, generally by stereoscope, of two images of the same object in a pair of stereographs, so as to form a distinct single object in relief.

3. CONSTRUCTION

3.1 It mainly consists of two parts, that is, the lens frame with folding legs and two similar plano-convex lenses having equal magnifications. The lens frame has a recess to accommodate the bridge of the observer's nose and has arrangement for adjusting the distance (adjustable type) between the centres of the lenses to suit the inter-pupillary distance of the observer. The inter-pupillary distance may be fixed also (fixed type). Pocket stereoscope may be provided with a photo holder that can be fitted on the legs on customer's demand.

4. GENERAL AND FUNCTIONAL REQUIREMENTS

4.1 The pocket stereoscope shall meet the following technical requirements:

- a) Magnification — $2.5\times$ to $3\times$
- b) Distance between the centres of the lenses — (Adjustable type) 55 to 75 mm
(Fixed type) 65 ± 1.5 mm
- c) Clear aperture of the lenses — 30 mm

4.2 In the adjustable type, the frame holding the viewing lenses shall permit adjustment of the distance between the centres of the lenses (interocular distance) from 55 to 75 mm. An interocular scale shall be provided on the frame and an index mark on the sliding part of the frame shall indicate the distance. The scale shall be marked in mm and figured at 60 mm and 70 mm. The lines at 60, 65, 70 and 75 mm shall be longer than the rest of the lines. Once adjusted, the distance shall be kept fixed by clamping the sliding frame with washer and wing nut.

4.3 The lenses shall be mounted in such a way that they are free from strain. The seatings of the two lenses shall be in the same plane with their axes (and also the axes of lenses) parallel to each other.

4.4 The interocular scale shall be in correct relationship with the distance between the centres of the lenses.

4.5 The legs shall have positive locking and shall not rock when the stereoscope is set for observation. The legs shall be easily foldable. No adjustment of legs shall be necessary for achieving stereoscopic fusion, once the stereoscope is set for observation.

4.6 All engravings and markings shall be neat and well defined having adequate contrast with the background.

4.7 All screws shall be plated and flushed with the outer surface to give a streamlined look to the instrument.

5. MATERIAL

5.1 Frame — Aluminium alloy or any other suitable light material with protective finish shall be used.

5.2 Lens — Lens shall be of good quality optical glass normally hard crown. Optical glass of durability Grade DI of IS : 1400-1960*, is recommended. The lenses shall also conform to the relevant requirements of IS : 988-1959†.

5.3 Circlip — It shall be made of hard rolled brass wire and chromium plated. The ends of the circlip shall be rounded to prevent scratches on the lenses on assembly.

5.4 Legs — Legs shall be made of good quality spring steel and chromium plated.

5.5 Wing Nut and Spring Washer — Wing nut shall be of brass and washer of spring steel and both shall be plated.

5.6 Carrying Case — It shall be made of leather or leatherite, waterproof canvass or any other suitable light material.

*Specification for optical glass.

†General requirements for optical components.

6. TESTS

6.1 With legs fully extended and the instrument set for observation on a flat base, the flat surface of each lense shall be at the same height from the base and parallel to it, as far as practicable. The instrument shall not rock and be stable in working position.

6.2 Equivalent Focal Length — This shall be determined as described in IS : 988-1959*. The equivalent focal length of the two lenses shall be equal and shall not differ by more than ± 1 percent from each other and this shall be so balanced that the stereoscope provides a good strain free stereoscopic fusion. The equivalent focal length shall not vary by more than ± 5 per cent of the nominal value.

6.3 Magnifying Power — It shall be calculated by the formulae:

$$\text{Magnifying power} = 1 + \frac{D}{f}$$

where

D = least distance of distinct vision taken as 250 mm, and

f = measured focal length of the lens in mm.

6.3.1 The calculated value of magnifying power shall not differ from the marked value by more than 5 percent.

6.4 Transmission — The integrated transmission shall not be less than 90 percent. Axial transmission of the lenses shall be measured as laid down in IS : 2754-1964†.

6.5 Interocular Scale — This shall be tested by measuring the distance across the eyecups, the measurement being taken from the side of one eyecup to the same side of the other. This shall be in correct relationship with the distance between the centres of the lenses to within one millimetre.

6.6 The fused image, as far as possible, shall be free from colours and distortion.

7. MARKING

7.1 Each stereoscope shall be marked with the name and manufacturer's trade-mark, if any, serial number and year of manufacture.

*General requirements for optical components.

†General requirements for optical instruments.

7.1.1 The instrument may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

8. PACKING

8.1 The stereoscope shall be securely packed for storage and transit with its carrying case so that there is no possibility of any deterioration or damage during transit.

8.2 The package containing stereoscopes in their cases shall be marked with the description, number of contents, the standard symbol for indicating fragile contents and the legend 'HANDLE WITH CARE' in red according to IS : 1260 (Part 2)-1973*.

*Specification for pictorial markings for handling and labelling of goods: Part 2 General goods (*first revision*).

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